REMARKS

The present amendment is respectfully submitted in response to the outstanding Office Action of January 2, 2003 on the above-identified patent application.

At the outset, the Applicants respectfully submit that the certified priority document for the above-identified application has been filed. The Applicants enclose a photocopy of the transmittal letter, the cover page of the certified priority document and a copy of the return postcard. The Applicants respectfully but strenuously request that the Examiner acknowledge the certified priority document.

The Office Action rejected Claims 16, 18 and 20-22 under 35 U.S.C. §102(e) as being anticipated by the Samuels reference (U.S. Patent No. 5,937,225). Similarly, the Office Action rejected Claims 17, 19 and 23 under 35 U.S.C. §103(a) as being obvious over the Samuel reference in view of the Garr reference (U.S. Patent No. 5,802,420); rejected Claim 15 under 35 U.S.C. §103(a) as being obvious over the combination of the Samuels and Garr references; rejected Claims 1, 3, 6 and 13-14 under 35 U.S.C. §103(a) as being obvious over the combination of the Samuels and Yano (U.S. Patent No. 6,476,926) references and/or the Owa reference (U.S. Patent No. 6,348,971); rejected Claims 2, 4, 5 and 7-10 under 35 U.S.C. §103(a) as being obvious over the Samuels reference, the Yano reference and/or the Owa reference, in combination with the Garr reference; and rejected Claims 11 and 12 under 35 U.S.C. §103(a) as being obvious over the Samuel reference, Yano reference and/or the Owa reference, in combination with the Brown reference (U.S. Patent No. 5,970,725).

The Applicants respectfully traverse the above rejections.

According to newly-amended Claim 1, it is determined whether or not remaining ink is sufficient for to complete print operations based on print data, and a user is notified of the determination result before the printer starts the printing. Therefore, the user may be notified of sufficiency of remaining ink even when a remaining ink amount is relatively small if the ink amount is sufficient for particular print job. Also, the user may be notified of insufficiency of remaining ink even when a remaining ink amount is relatively large if the ink amount is not sufficient for a particular job.

On the other hand, Samuels merely notifies a user of that toner is soon expected to be empty when a global pixel count approaches the global threshold, but does not notify the user whether or not remaining toner amount is sufficient for a specific print job. That is, when the global pixel count approaches the global threshold, the user is notified of that the toner will be soon empty regardless of data amount of particular print job. Moreover, Samuels does not suggest that prediction is performed before printing is started.

The above is applicable to claims 1, 13, and 14.

According to the method of Claim 18, preview data is generated based on image data, and required ink amount is predicted based on the preview data. This can reduce a processing time for predicting the required ink amount (see the specification, page 19, lines 1 through 3.)

On the other hand, Samuels predicts a necessary toner amount by means of simple algorithm or by a table look up, but not based on preview data.

This likewise applies to Claim 4.

Claims 17 and 19 stand rejected as being unpatentable over Samuels in combination with Garr.

The method of claim 17 determines how much ink is short to print out the print data.

The Office Action states that this feature of the claims is disclosed in Garr. Although Garr displays a remaining toner amount on the monitor screen 500, it does not indicate whether the remaining ink amount is sufficient for the printer to complete the print operations.

The above likewise applies to Claim 2.

In the method of Claim 19, necessary ink amount is predicted based on preview data.

Neither Samuels nor Garr disclose preview data.

Claim 15 stand rejected as being unpatentable over the combination of Samuels and Garr. The Examiner points out that Garr teaches of predicting the required ink amount based on the preview data, with reference to Fig. 7, column 18, line 15-37.

According to the amended claim 15, the preview data is generated by reducing the size of image data. Garr discloses no such preview.

For all of the reasons above, it is respectfully submitted that the presently pending claims are in immediate condition for allowance. The Examiner is respectfully requested to withdraw his rejections of the claims, to enter the present amendment, to allow the claims, and to pass this application to early issue.

Respectfully submitted,
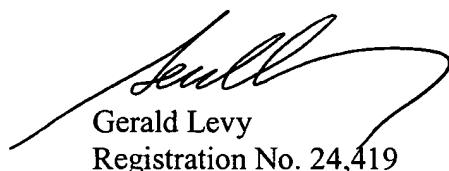
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Please amend claims 1, 13, 14, 15 and 16 as follows:

1.   (Amended)   A print system comprising:

a terminal that generates image data;

at least one printer that performs print operations for forming an image on a recording medium using an ink based on print data; and

a printer controller that is connected between the terminal and the printer and converts the image data into the print data;

wherein the printer controller comprises:

predicting means for predicting a required ink amount indicating an amount of ink required for the printer to perform the print operations based on the print data;

a memory that stores required ink amount data indicating the required ink amount; and

transmitting means for transmitting a request signal to the printer, the request signal requesting the printer to transmit remaining ink amount data indicating a remaining ink amount which indicates an amount of ink remaining in the printer;

the printer comprises:

managing means for managing the remaining ink amount data; and

transmitting means for transmitting the ink amount data in response to the request signal; and

at least one of the terminal and the printer controller comprises:

receiving means for receiving the remaining ink amount data from the transmitting means of the printer;

retrieving means for retrieving the required ink amount data stored in the memory;

determination means for determining based on the remaining ink amount data and the required ink amount data, whether or not the remaining ink amount is sufficient to [perform] complete the print operations, based on the print data, before the print operations are started; and

notifying means for notifying a user of a determination result determined by the determination means, the notifying means notifying the user before the print operations are started.

13. (Amended) A printer controller connected between a terminal and a printer, the terminal generating image data, the printer performing print operations for forming an image on a recording medium based on print data, the printer transmitting remaining ink amount data indicating an amount of ink remaining in the printer in response to a request signal from external devices, the printer controller comprising:

converting means for converting the image data into the print data;

predicting means for predicting, based on the image data, a required ink amount indicating an ink amount required by the printer for performing the print operations based on the print data;

transmitting means for transmitting the request signal to the printer;

11

receiving means for receiving the remaining ink amount data from the printer;

determination means for determining, before the print operations start, whether the remaining ink amount is sufficient for the printer to [perform] complete the print operations, based on the print data; and

notifying means for notifying a user of determination results determined by the determination means before a printing operation based on the print data is started at the printer.

14.   (Amended)   A printer controller connected between a terminal and a printer, the terminal generating image data, the printer performing print operations for forming an image on a recording medium based on print data, the printer transmitting remaining ink amount data indicating an amount of ink remaining in the printer in response to a request signal from external devices, the printer controller comprising:

converting means for converting the image data into the print data;

predicting means for predicting, based on the image data, a required ink amount indicating an ink amount required by the printer for performing the print operations based on the print data;

first transmitting means for transmitting the request signal to the printer;

receiving means for receiving the remaining ink amount data from the printer;

determination means for determining, before the print operations start, whether the remaining ink amount is sufficient for the printer to [perform] complete the print operations based on the print data; and

second transmitting means for transmitting required ink amount data indicating the

12

required ink amount and the remaining ink amount data to the terminal.

15. (Amended)　A predicting method for predicting a required ink amount required by a printer for performing print operations, the predicting method comprising the steps of:

generating preview data based on image data, by reducing the size of the image data;

determining an average tone of pixels of a preview image, the preview image being formed based on the preview [data] data;

based on the average tone, calculating an average density of a print image to be printed; and

detecting an ink amount required for printing an entire print region with the average density at an actual size.

16. (Amended)　A notifying method of notifying a user of an ink amount, the notifying method comprising the steps of:

(a)　converting image data into print data;

(b)　predicting a required ink amount indicating an ink amount required by a printer for performing print operations, the print operations being performed for forming a print image on recording medium based on the print data;

(c)　detecting a remaining ink amount indicating an ink amount remaining in the printer;

(d)　comparing the required ink amount with the remaining ink amount;

(e)　determining whether or not the remaining ink amount is sufficient for the printer

to [perform] <u>complete</u> the print operations <u>based on the print data</u>; and

(f)   notifying a user of a determining result of the step (e)<u>, before the printer starts</u>

<u>performing the print operations based on the print data</u>.

14